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LIX.—On *Pterocyon*, *Rousettus*, and *Myonycteris*.

By KNUD ANDERSEN.

THE present paper is a brief summary of notes written down during a revision of the fruit-bats of the genera *Pterocyon*, *Rousettus*, and *Myonycteris* in the collection of the British Museum.

*Synopsis of the Genera and Species.*

Common characters: tongue normal; molars well developed; occipital region of skull not elongated and tubular; incisors  $\frac{2}{2}$ — $\frac{2}{2}$ ; postcanine teeth  $\frac{5}{5}$ ; second digit clawed; a short tail.

a. Cranial rostrum longer; front of orbit vertically above posterior half or middle of  $m^1$ ; basicranial axis markedly deflected.

a'. Premaxillaries separated in front; tympanics forming a bony auditory meatus;  $p^2$  in cross section twice the size of an upper incisor;  $m_1$  equal in length to  $m_2$  and  $m_3$  together. General size large: forearm 114-132 mm. Ethiopian . . . . *Pterocyon*.

- a*<sup>2</sup>. Rostrum relatively longer: front of orbit to tip of nasals equalling or exceeding maxillary tooth-row; fur longer, more woolly, not closely appressed; colour darker. Forearm 127-131 mm. Madagascar . . . . . *Pt. Dupreanus*.
- b*<sup>2</sup>. Rostrum relatively shorter: front of orbit to tip of nasals less than maxillary tooth-row; fur very short, closely appressed; colour lighter.
- a*<sup>3</sup>. Skull larger: total length 54.5-62.5 mm.; tooth-rows longer: *c-m*<sup>2</sup> 21-23.8; molars narrower. Forearm 117.5-132. African continent . . . . . *Pt. helvus*.
- b*<sup>3</sup>. Skull smaller: total length 51.5-55 mm.; tooth-rows shorter: *c-m*<sup>2</sup> 19.2-20.8; molars broader. Forearm 114-127. S.W. Arabia . . . . . *Pt. sabaeus*.
- b*<sup>1</sup>. Premaxillaries in contact or co-ossified in front; no bony auditory meatus; *p*<sup>2</sup> reduced: subequal in size to an upper incisor; *m*<sub>1</sub> shorter than *m*<sub>2</sub> and *m*<sub>3</sub> together. General size moderate: forearm 69.5-99 mm. Ethiopian, Oriental, Austro-Malayan . . . . . *Roussetus*.
- c*<sup>2</sup>. Wings from back of 1st toe.
- c*<sup>3</sup>. Pollex (with claw) 30-37.5 mm.; 2nd phalanx of 3rd digit 50.5-61.5.
- a*<sup>4</sup>. Ears not attenuated at tip; lower leg 40-45.5 mm.
- a*<sup>5</sup>. Skull smaller: total length 40.5-43.8 mm.; rostrum slenderer; palate ridges normally 3+4+1\*. Forearm 89-99. S. Africa . . . . . *R. Leachi*.
- b*<sup>5</sup>. Skull larger: total length 43.6-46.7 mm.; rostrum heavier; palate ridges 4+4+1. Forearm 88-99. Angola to Palestine . . . . . *R. aegyptiacus*.
- b*<sup>4</sup>. Ears attenuated at tip; lower leg 37-39.5 mm.; forearm 87-96. Arabia to Sind . . . . . *R. arabicus*.
- d*<sup>3</sup>. Pollex (with claw) 24-30 mm.; 2nd phalanx of 3rd digit 36-47.2.
- c*<sup>4</sup>. Molars not unusually narrow; fur short; notopatagium naked.
- c*<sup>5</sup>. *m*<sub>3</sub> elliptical in outline; width of ears (flattened) 14.5-15.8 mm.
- a*<sup>6</sup>. *p*<sup>2</sup> not deciduous; fur on nape and shoulders not unusually scarce. Forearm 80.5-87.5 mm. India, Himalayas, to S. China . . . . . *R. Leschenaulti*.

\* 3 anterior, undivided; 4 middle, interrupted in the median line; 1 posterior, at palation border.

- b*<sup>5</sup>. *p*<sup>2</sup> deciduous; nape and shoulders seminaked. Forearm 79-85.5 mm. Ceylon . . . . . *R. semiuudus*.
- d*<sup>5</sup>. *m*<sub>3</sub> subcircular in outline; width of ears (flattened) 10-13 mm.
- e*<sup>6</sup>. *p*<sup>2</sup> not deciduous. Forearm 77-87.2 mm. Indo-Malayan. . . . . *R. amplexicaudatus*\*.
- d*<sup>6</sup>. *p*<sup>2</sup> deciduous. Forearm 69.5-75 mm. Austro-Malayan. . . . . *R. brachyotis*.
- d*<sup>4</sup>. Molars unusually narrow; bony palate narrow; fur longer; notopatagium and tibiæ well haired. Forearm 72.5-75 mm. Celebes . . . . . *R. celebensis*.
- d*<sup>2</sup>. Wings from back of 2nd toe; fur long and dense.
- e*<sup>3</sup>. Frontal region of skull between postorbital processes concave; molars of normal breadth; lower leg short: 29-31 mm. Forearm 79-83.5. Ethiopian . . . . . *R. angolensis*.
- f*<sup>3</sup>. Frontal region of skull between postorbital processes flat; molars excessively narrow; lower leg 39-40 mm. Forearm 88.5-90. Ethiopian . . . . . *R. lanosus*.
- b*. Cranial rostrum shortened: front of orbit vertically above back of *p*<sup>4</sup>; basicranial axis nearly parallel to alveolar border. Ethiopian . . . . . *Myonycteris*.
- c*<sup>1</sup>. Small: forearm 60-67 mm. Equatorial Africa . . . . . *M. collaris*.

## I. PTEROCYON, Pet.

- |   | Type.               |
|---|---------------------|
| 1861. <i>Pterocyon</i> , Peters, MB. Akad. Berlin, p. 423 . . . . .   | <i>Pt. helvus</i> . |
| 1881. <i>Leiponyx</i> , Jentink, Notes Leyden Mus. iii. p. 60 [nec <i>Liponyx</i> , Vieillot, 1816, a genus of birds] . . . . . | <i>Pt. helvus</i> . |

Basicranial axis considerably deflected: alveolar line projected backward passing through bases of post-tympanic and paroccipital processes. Rostrum long: front of orbit vertically above posterior half or middle of *m*<sup>1</sup>. Tympanic produced externally into a short tubular bony auditory meatus (a peculiarity unique among bats). Premaxillaries separated in front. Cutting-edges of lower incisors simple (not bifid). *p*<sup>2</sup> in cross section twice the size of an upper incisor. *m*<sub>1</sub> equal in length to *m*<sub>2</sub> and *m*<sub>3</sub> combined. Palate ridges 4+3+3. Size large: forearm 114-132 mm.

*Range*.—Madagascar; African continent, from Sennaar and Senegambia in the north to Nyasaland and Namaqualand in the south; S. Arabia.

\* On *R. minor*, see p. 509.

1. *Pterocyon Dupreanus*, Schl. & Poll.

1866. *Pteropus Dupreanus*, Schlegel & Pollen, P. Z. S. p. 419 (N.W. Madagascar).

Range.—Madagascar.

Cotypes in the Leiden Museum.

2. *Pterocyon helvus*, Kerr.

1771. *Lesser Ternate Bat*, Pennant, Syn. Quadr. p. 362. no. 274 B, pl. xxxi. fig. 1.

1774. *Vespertilio Vampyrus* (nec L.), var. C, Schreber, Säugth. i. p. 154.

1777. *Pteropus Vampyrus*, var.  $\gamma$ , Erxleben, Syst. Regn. An., Mamm. p. 133.

1781. *Lesser Ternate Bat*, Pennant, Hist. Quadr. ii. p. 552, pl. lii. fig. 1.

1788. *Vespertilio Vampyrus*, var.  $\gamma$ , Gmelin, Linn. Syst. Nat. ed. 13, i. p. 45.

1792. *Pteropus Vampyrus*, var.  $\gamma$ , Donndorff, Zool. Beytr. i. p. 62.

1792. *Vespertilio Vampyrus helvus*, Kerr, Anim. Kingd. i. pt. i. pp. xvii, 91, no. 108.

1810. *Pteropus stramineus*, E. Geoffroy, Ann. Mus. d'Hist. nat. xv. p. 95 (Timor, *errore*).

1861. *Pterocyon paleaceus*, Peters, MB. Akad. Berlin, p. 423 (Africa).

1861. *Pteropus mollipilosus*, H. Allen, Proc. Ac. Nat. Sci. Philad. p. 159 (Gaboon).

1865. *Pteropus palmarum*, Heuglin, Leopoldina, Heft v. nos. 3-4, p. 34 (Middle and Upper Nile).

1866. *Xantharpyia leucomelus*, Fitzinger, SB. Akad. Wien, liv. Abth. i. H. 10, p. 544 (Sennaar).

1881. *Leiponyx Büttikoferi*, Jentink, Notes Leyden Mus. iii. p. 59 (Liberia).

Range.—Africa, from Somaliland, Sennaar, and Senegambia in the north, to Nyasaland, Mashonaland, and Namaqualand in the south.

Type not in existence.

Kerr's *Vespertilio Vampyrus helvus*.—The present species was well known to the early post-Linnean systematists, who put it down as a variety of *Vespertilio* (or *Pteropus*) *vampyrus*, L. The earliest recognizable figure and description appear to be those given by Pennant, in 1771 (*l. s. c.*), under the name "Lesser Ternate Bat," so called because Pennant considered it a lesser variety of Seba's "*Canis volans Ternatanus orientalis*." Kerr's *V. Vampyrus helvus* was based on Pennant's description and figure of this bat. The type, originally in Museum Leverianum, has probably been lost. No habitat given by Pennant nor by Kerr. Senegal may be fixed as the type locality of *Pt. helvus*.

Jentink's *Leiponyx Büttikoferi*.—Type locality: St. Paul's

River, Millsbury, Liberia; type in the Leyden Museum. Chief characters, according to Jentink: postcanine teeth  $\frac{4}{5}$ ; second digit without claw. But the rest of the description and all the measurements are sufficient evidence that *L. Büttikoferi* was based on a *Pt. helvus*. It is important to note that the skull was not extracted from the specimen (I conclude from the fact that it is not recorded in Jentink's Catalogue of osteological specimens in the Leyden Museum); the small posterior upper molar ( $m^2$ ) can therefore easily have been overlooked; in aged individuals with much worn teeth it is not rarely lost. The lack of a claw to the index-finger must be fortuitous or an individual abnormality.

### 3. *Pterocyon sabceus*, sp. n.

Differs from *Pt. helvus* in the following particulars:—Skull smaller; total length (one male ad., six females ad.) 51·5–55 mm., against 54·5–62·2 in *Pt. helvus* (nineteen males ad., twelve females ad.); maxillary tooth-row ( $c-m^2$ ) 19·2–20·8, against 21–23·5; cranial rostrum slenderer; posterior premolar and molars, above and below, markedly broader than in the larger-skulled *Pt. helvus*. The external dimensions average slightly smaller.

*Range*.—S. Arabia (Lahej, Aden).

*Type*.—♀ ad., skin and skull. Lahej, Aden; Aug. 19th, 1899. Collected by Mr. Dodson. British Museum, no. 99. 11. 6. 3.

## II. ROUSETTUS, Gray.

	Type.
1821. <i>Rousettus</i> , Gray, London Medical Repository, xv. p. 299 (Apr. 1, 1821) .....	<i>R. aegyptiacus</i> .
1829. <i>Cercopterus</i> , Burnett, Quart. Journ. Sci. Lit. Art, xxvii. p. 269 .....	<i>R. aegyptiacus</i> .
1843. <i>Eleutherura</i> , Gray, List Mamm. B. M. p. xix. Nomen nudum.	
1843. <i>Xantharpyia</i> , Gray, List Mamm. B. M. pp. xix, 37 .....	<i>R. amplexicaudatus</i> .
1844. <i>Eleutherura</i> , Gray, Voyage 'Sulphur,' i. p. 29 .....	<i>R. Leachi</i> .
1852. <i>Cynonycteris</i> , Peters, Reise Mossamb., Zool. i., Säugeth. p. 25 .....	<i>R. Leachi</i> .
1870. <i>Senonycteris</i> , Gray, Cat. Monk. &c. p. 115.	<i>R. seminudus</i> .

Basicranial axis considerably deflected: alveolar line projected backward passing through upper part of occipital condyle (minimum of deflection) or through base of zygoma (maximum). Front of orbit vertically above posterior half or middle of  $m^1$ . Tympanic not produced into a bony

auditory meatus. Premaxillaries in contact or co-ossified in front. Cutting-edges of lower incisors (when unworn) bifid; the emargination of the cutting-edge continued as a shallow vertical groove for a short distance down the front face of the crown.  $p^2$  subequal in size to an upper incisor.  $m_1$  shorter than  $m_2$  and  $m_2$  combined. Palate ridges 4 (or 3) + 3 (or 4) + 1 (or 2). Size moderate: forearm 69·5–99 mm.

*Range*.—The African continent, exclusive of the Mediterranean countries W. of Egypt; S. Asia, from Palestine and Cyprus to S. China; the Indo- and Austro-Malayan Archipelago, as far east as the Solomon Islands.

### 1. *Rousettus Leachi*, A. Sm.

1823. *Pteropus collaris* (nec Ill.), Lichtenstein, Verz. Doubl. Mus. Berlin, p. 3, no. 47 (Terra Caffrorum).  
 1827. *Pteropus amplexicaudatus* (nec Geoff.), Temminck, Mon. Mamm. i. pp. 260–261 (Cape).  
 1829. *Pteropus Leachi*, A. Smith, Zool. Journ. iv. p. 433 (Cape).  
 1832. *Pteropus hottentottus*, Temminck, in Smut's Enum. Mamm. Capens. p. 3 (Cape).  
 1843. *Cynopterus brevicaudatus* (nec Is. Geoff.), Gray, List Mamm. B. M. p. 39.

Distinguished from all other species of the genus by the combination of the following characters:—Frontal region of skull between postorbital processes flattened; premaxillaries in contact, but rarely co-ossified; total length of skull 40·5–43·8 mm.; palate ridges normally 4 + 3 + 1. Wings from back of first toe, or interspace between first and second toe; pollex (with claw) 31–35·5 mm.; second phalanx of third digit 50·5–60 mm.; second phalanx of fifth digit nearly always shorter than first phalanx; ears not attenuated at tip; fur short. Forearm 89–99 mm.

*Range*.—S. Africa: Cape Colony, Natal, Lower Zambesi (Inhambane).

*Cotype* in the British Museum.

Illiger's *Pteropus collaris*.—Type locality: "die ostlichen [afrikanischen] Inseln"; no type. Illiger's *Pteropus collaris* (Abh. Akad. Berlin, 1804–11, pp. 78, 84; published 1815) is Brisson's *Pteropus collo rubro*, "Rousette à col rouge" (1762), Schreber's *Vespertilio Vampyrus*, var. B (1774), Pennant's "Rougette" (1781), Kerr's *Vespertilio Vampyrus subniger* (1792; earliest available name of the species), E. Geoffroy's *Pteropus rubricollis* (1810). In 1823 Lichtenstein (*l. s. c.*) misapplied the name *Pt. collaris* to the S. African fruit-bat here under consideration; but the error, hidden as it was in the little-known 'Verz. Doubl. Mus.

Berlin,' passed for many years unnoticed, the species being constantly referred to as *Pteropus Leachi* or *Pt. hottentottus*. In 1852 Peters ('Reise nach Mossambique') confirmed Lichtenstein's wrong identification of *Pt. collaris*, and from about that year the names *Leachi* and *hottentottus* gradually went out of fashion, being replaced by *collaris*; from about 1870 *Leachi* and *hottentottus* only appear in the lists of synonyms of *collaris*.

## 2. *Rousettus aegyptiacus*, E. Geoff.

1810. *Pteropus aegyptiacus*, E. Geoffroy, Ann. Mus. d'Hist. nat. xv. p. 96 (Lower Egypt).  
 1825. *Pteropus Geoffroyi*, Temminck, Mon. Mamm. i. p. 197, pl. xv. figs. 14, 15 (skull) (Egypt, "Senegal").  
 1870. *Eleutherura unicolor*, Gray, Cat. Monk. &c. p. 117 (Gaboon).

Similar to *R. Leachi*, but with larger skull, broader rostrum, broader frontal region, and heavier teeth; palate ridges normally 4+4+1. Forearm 88-99 mm.

*Range*.—From Loanda and Gaboon to Egypt, Erythrea, Syria, Palestine, and Cyprus.

*Cotypes* in the Paris Museum.

## 3. *Rousettus arabicus*, And. & de Wint.

1902. *Rousettus arabicus*, Anderson & de Winton, Zool. Egypt., Mamm. pp. 86, 88, 89-90 (Aden).

Similar to *R. Leachi*, but with shorter and lower rostrum, narrower ear-tips, shorter tibia and foot. Forearm 87-96 mm.

*Range*.—From Arabia (Aden, Muscat) to Sind (Karachi).  
*Type* in the British Museum.

## 4. *Rousettus Leschenaulti*, Desm.

1820. *Pteropus Leschenaulti*, Desmarest, Encycl. Méth., Mamm. i. p. 110. no. 142 (Pondichery).  
 1832. *Pteropus* sp., Hodgson, J. A. S. B. i. p. 340 (Nepal).  
 1835. *Pteropus pyrivorus*, Hodgson, J. A. S. B. iv. p. 700 (Nepal).  
 1843. *Cynopterus affinis*, Gray, List Mamm. B. M. p. 39 (Himalaya).  
 1870. *Eleutherura marginata*, Gray, Cat. Monk. &c. p. 118 ("Nepal," i. e. Nasirabad).  
 1870. *Eleutherura fuliginosa*, Gray, Cat. Monk. &c. p. 118 (Lao Mts., Siam).  
 1870. *Eleutherura fusca*, Gray, Cat. Monk. &c. p. 119 ("India?").  
 1873. *Cynonycteris infuscata*, Peters, MB. Akad. Berlin, p. 487 (Calcutta).

Allied to *R. arabicus*, but smaller, with the muzzle shorter and slenderer, the tip of the ears not attenuated, the pollex markedly shorter, wings shorter, especially the first and second

phalanx of the third digit, and the foot smaller. Forearm 80·5–87·5 mm.

*Range*.—Himalayas (Nepal), extending southward over the Indian Peninsula (Pondichery), eastward through Bengal, Burma, Siam (Lao Mts.) to S. China (Amoy).

*Type* in the Paris Museum.

Peters's *Cynonycteris infuscata*.—Type locality: "angeblich aus Calcutta" (a dealer's specimen); type in the Berlin Museum (no. 361). "Sehr ähnlich der *C. Leschenaultii*, in allen Verhältnissen kleiner, dunkelbraun von Farbe, mit schwarzen Krallen und dem ersten falschen Backzahn grösser"; detailed measurements given; forearm 68, third metacarpal 42, tibia 29 mm. The type, I am informed by Prof. Matschie, is a young, not full-grown individual ("die Epiphysen an den Fingergelenken sind noch nicht mit den Phalangen verwachsen," Matschie, *in litt.*); hence its small size.

#### 5. *Rousettus seminudus*, Gray.

1870. *Xantharpyia seminuda*, Gray, Cat. Monk. &c. p. 115 (Ceylon).

Similar to *R. Leschenaultii*, but  $p^2$  deciduous, nape and shoulders seminaked, general colour of fur lighter. Forearm 79–85·5 mm.

*Range*.—Ceylon.

*Type* in the British Museum.

Gray's *Xantharpyia seminuda*.—Type locality: Ceylon. "*Pteropus seminudus*, Kelaart," is a nomen nudum; in the paper usually referred to by authors, viz. Blyth's account in J. A. S. B. xxi. p. 345 (1852), on a collection of mammals sent by Kelaart to the Asiatic Society of Bengal, it appears only as a synonym, without comment, of *Ph. Leschenaultii*; the same is the case in Kelaart's 'Prodromus Faunæ Zeylanicæ' (1852). The name remained a nomen nudum, until in 1870 (*l. s. c.*) Gray published a brief diagnosis of "*Xantharpyia seminuda*"; the British Museum specimen on which Gray based this diagnosis is, therefore, the type of the species.

#### 6. *Rousettus amplexicaudatus*, E. Geoff.

1810. *Pteropus amplexicaudatus*, E. Geoffroy, Ann. Mus. d'Hist. nat. xv. p. 96, pl. iv. (whole fig.) (Timor).

1870. *Eleutherura infumata*, Gray, Cat. Monk. &c. p. 118 (Flores).

1870. *Eleutherura philippinensis*, Gray, Cat. Monk. &c. p. 119 (Manila).

1898. *Cynonycteris Bocagei*, Seabra, J. Sci. Math. Lisboa, (2) v. pp. 160–161, 169, pl. i. fig. 11 (palate ridges) (Timor).

Similar to *R. Leschenaultii*, but  $m_3$  subcircular in outline, ears narrower. Forearm 77–87·5 mm.



*Range*.—Cambodja, Philippines, Borneo, Sumatra, Engano, Flores, Savu, Alor, Timor.

*Type* in the Paris Museum.

#### 7. *Roussettus minor*, Dobs.

1873. *Cynonycteris minor*, Dobson, J. A. S. B. xlii. pt. ii. p. 203, pl. xiv. fig. 9 (ear) (Java).

I have not, as yet, seen the type of *Cynonycteris minor*. In none of the characters given by Dobson is there anything to prove that *R. minor* is different from the true *R. amplexicaudatus* (Dobson, it must be remembered, lumped the continental *R. Leschenaulti* and the Indo-Malayan, insular *R. amplexicaudatus* into one species, "*Cynonycteris amplexicaudata*," and when describing *R. minor* probably compared it with *R. Leschenaulti*, not with the true *R. amplexicaudatus*),—save perhaps in one: the length of forearm is stated to be only 71 mm., whereas I have never seen a fully adult *R. amplexicaudatus* with the forearm less than 77 mm. I prefer to leave open the question as to the validity of *R. minor*, until I have had an opportunity of examining the type.

*Range*.—Java.

*Type* in the Calcutta Museum.

#### 8. *Roussettus brachyotis*, Dobs.

1877. *Cynonycteris brachyotis*, Dobson, P. Z. S. p. 116 (Duke of York Isl.).

Similar to *R. amplexicaudatus*, but smaller, with shorter and narrower ears;  $p^2$  deciduous; tooth-rows shorter. Forearm 70–75 mm.

*Range*.—Amboina, New Guinea, New Ireland, Solomon Isl.

*Type* in the British Museum.

#### 9. *Roussettus celebensis*, sp. n.

*Diagnosis*.—Bony palate and all molariform teeth, above and below, unusually narrow. Fur longer and richer than in any of the foregoing species; notopatagium partly (or wholly) haired; general size small. Forearm 72·5–75 mm.

*Skull*.—General size as in *R. amplexicaudatus*; rostrum very low and slender; bony palate unusually narrow; width externally across  $m^2$ – $m^2$  9·7 mm. (two adults), against 10·2–11·8 in *amplexicaudatus* (ten adults).

*Teeth*.—Upper canine and  $p^3$  (middle premolar) widely

separated;  $p^2$  in the centre of the interspace between these two teeth, not deciduous; last premolar and molars above and below very narrow:  $m_1$  at least twice as long as broad;  $m^2$  small, less than half the size of  $m^1$ ;  $p_2$  in cross section three or four times the size of a lower incisor;  $m_2$  about half the length of  $m_1$ ;  $m_3$  subcircular in outline.

*Palate ridges.*—4 + 3 + 1.

*External structure.*—Ears essentially as in *R. amplexicaudatus*: narrow, not attenuated below the tip, the tip itself broadly rounded off; antitragal lobe small, rounded. General size of the animal as in *R. brachyotis* (thus smaller than *R. amplexicaudatus*), but digits proportionally considerably longer than in any other eastern species of the genus (index of pollex 392, of third digit 1646, against 335–41 (pollex) and 1529–41 (third digit) in all other eastern species). Tail long, probably about 20 mm. (only dried skins examined).

*Fur.*—Longer, richer, and more velvet than in *R. amplexicaudatus* and allied eastern species; notopatagium clothed with dense fur; hairing on forearms, tibiae, interfemoral, and underside of plagiopatagium longer and richer; face more densely haired.

*Colour.*—Brighter than in *R. amplexicaudatus*. Back light Prout's brown, rump more inclining to mars-brown tinged with russet; sides of back and tibiae next to membranes almost vandyke-brown; crown and occiput dark brown, approaching bister; nape of neck broccoli-brown; a tuft of glandular mummy-brown hairs on either side of the neck in both sexes; entire underside of body dark greyish drab.—Immature individuals are similar in colour to adults, but without the mummy-brown neck-tuft.

*Range.*—Celebes.

*Type.*—♀ ad., skin and skull. Mt. Masarang, Celebes, 3500'; Oct. 1895. Collected by Dr. Chas. Hose. Brit. Mus. no. 97. 1. 2. 8. Three specimens examined.

*Remarks.*—On hasty inspection this species, owing to its small size, can easily be (and has in fact repeatedly been) confused with *R. brachyotis*. The larger skull, very narrow palate, narrow molars, not deciduous  $p^2$ , much longer pollex (28–30 mm., against 24–26 in *brachyotis*), longer wings (chiefly owing to the longer metacarpals), much longer fur, haired notopatagium, and much more densely haired tibiae readily distinguish it from *R. brachyotis*.

#### 10. *Rousettus angolensis*, Bocage.

1898. *Cynonycteris angolensis*, Bocage, Journ. Sci. Math. Lisboa, (2) v. pp. 133, 138, fig. (palate ridges) (Pungo Andonga, Cahata, Quibula).

Frontal region of skull between postorbital processes distinctly concave; premaxillaries co-ossified in front; molars as broad as (or broader than) in *R. Leachi*;  $p_2$  in cross section only equalling or slightly exceeding a lower incisor. Wings from back of second toe; second phalanx of fifth digit nearly always longer than first phalanx; antitragal lobe well developed; lower leg very short (29–31 mm.); fur long; notopatagium haired. Size smaller than in *R. Leachi*; forearm 77–83.5 mm.

*Range*.—Angola, north-westward to Cameroon and Togo, eastward through the Congo Basin to Ruwenzori and German East Africa.

*Cotypes* in the Lisbon and British Museums.

### 11. *Rousettus lanosus*, Thos.

1906. *Rousettus lanosus*, Thomas, Ann. & Mag. N. H. (7) xviii. p. 137 (Ruwenzori East).

Molars excessively narrow;  $p_2$  in cross section twice or three times the bulk of a lower incisor. Wings from back of second toe; second phalanx of fifth digit longer than first phalanx; antitragal lobe indistinct; lower leg not shorter than usual (39–40 mm.); fur long and coarse; notopatagium haired. Larger than *R. angolensis*: forearm 88.5–90 mm.

*Range*. Shoa; Ruwenzori East, 5000–13,000'.

*Type* in the British Museum.

### III. MYONYCTERIS, Matschie.

1899. *Myonycteris*, Matschie, Megachiroptera, pp. 61, 63. *Type*. *M. collaris*.

Basicranial axis only slightly deflected: alveolar line projected backward passing through middle of external auditory meatus. Tympanic not produced into a bony auditory meatus. Rostrum shortened, owing to enlargement of orbital cavity: front of orbit vertically above back of  $p^4$ . Premaxillaries in contact in front. Cutting-edges of lower incisors (when unworn) bifid.  $p^2$  in cross section subequal to an upper incisor.  $m^2$  and  $m_3$  rudimentary,  $m_2$  much reduced in size from one fourth to somewhat less than half the bulk of  $m_1$ . Palate ridges: 4 + 3 + ?. Size small: forearm 60–67 mm.

*Range*. Ethiopian.

Matschie's *Myonycteris*.—*Myonycteris* in its original sense (a subgenus of *Xantharpyia*; Matschie, l. s. c.) included two species, *M. torquata* (i. e. *collaris*; the type) and *M. angolensis*. But *angolensis* is a true *Rousettus*, whereas *collaris*, as being in skull and teeth more closely related to *Cynopterus*

than to *Rousettus*, but clearly different from both, must be kept in a separate genus. Matschie's definition of *Myonycteris* was, however, based not on the species selected by him as type of the subgenus, viz. *collaris*, but on *angolensis*; the diagnosis of the genus as given above is therefore entirely different from that published by Matschie.

### 1. *Myonycteris collaris*, Gray.

1870. *Cynopterus collaris*, Gray, Cat. Monk. &c. p. 123 ("W. Africa").

1878. *Cynonycteris torquata*, Dobson, Cat. Chir. B. M. p. 76, pl. v. fig. 1 (Angola).

1889. *Cynonycteris brachycephala*, Bocage, Journ. Sci. Math. Lisboa, (2) i. p. 197 (San Thomé).

Forearm 60–67 mm. Wings from back of first phalanx of second toe.

*Range*.—From the Congo Basin southward to Angola, north-westward to San Thomé, Liberia, and Sierra Leone.

*Type* in the British Museum.

Gray's *Cynopterus collaris*.—Type locality: "W. Africa"; the British Museum register for 1843 proves the specimen to have been obtained "near Congo." Gray's statement (*l. s. c.*) that the specimen is "young" is incorrect; his quotation of "Gray, List Mamm. B. M. (1843)," where the specimen is stated to have been registered under the name *Xantharpyia collaris*, does not refer to the printed text of that book, but to a hand-written addition by Gray in the British Museum copy of the book. Prior to 1870 "*collaris*" had not been used as a specific name in the genus *Cynopterus*; it is therefore valid, and antedates *Cynonycteris torquata*, Dobson.

Bocage's *Cynonycteris brachycephala*.—Type locality: S. Thomé, Gulf of Guinea; type in the Lisbon Museum. From the description ("la première prémolaire et la dernière molaire extrêmement petites aux deux mâchoires"; forearm 62 mm.) and the figure of the skull and teeth in palate view clearly a *M. collaris*.

### General Remarks.

*The Genera*.—*Rousettus* is allied to *Pterocyon*; the two genera probably represent diverging branches from one common stem. They accord in most of their important cranial, dental, and external characters; in both the basi-cranial axis is deflected to practically the same degree. In having the premaxillaries in contact or co-ossified (not separated), the tympanic not produced into a bony auditory meatus,  $m_1$  not lengthened, and  $m^2$  less reduced in size,

*The Species and their Technical Names in this Paper, as compared with Dobson's 'Catalogue' and Matschie's 'Megachiroptera.'*

Dobson, 1878.	This paper.	Matschie, 1899.
<i>Cynonycteris Dupreana</i> .....	<i>Pterocyon Dupreanus</i> .....	( <i>Pterocyon</i> ) <i>Dupreanus</i> .
" <i>straminea</i> .....	" <i>stramineus</i> .....	" <i>stramineus</i> , pt. ( <i>Leiponya Büttikoferi</i> .)
" <i>collaris</i> .....	" <i>sabaeus</i> .....	( <i>Pterocyon</i> ) <i>stramineus</i> , pt.
" <i>egyptiaca</i> .....	<i>Roussettus Leachi</i> .....	( <i>Xantharpyia</i> ) <i>collaris</i> , pt.
" <i>amplexicaudata</i> .....	" <i>egyptiacus</i> .....	" <i>egyptiaca</i> .
" <i>minor</i> .....	" <i>arabicus</i> .....	" <i>amplexicaudata</i> .
" <i>brachyotis</i> .....	" <i>Leschenaulti</i> .....	" <i>amplexicaudata</i> .
" <i>amplexicaudata</i> , pt. ....	" <i>seminudus</i> .....	" <i>brachyotis</i> .
" .....	" <i>amplexicaudatus</i> .....	( <i>Myonycteris</i> ) <i>angolensis</i> .
" .....	" <i>minor</i> .....	" <i>torquata</i> .
" .....	" <i>brachyotis</i> .....	( <i>Xantharpyia</i> ) <i>brachycephala</i> .
" .....	" <i>celebensis</i> .....	
" .....	" <i>angolensis</i> .....	
" .....	" <i>lanosus</i> .	
" <i>torquata</i> .....	<i>Myonycteris collaris</i> .....	

*Rousettus* is more primitive than *Pterocyon*; but it is on a higher level in the rather shorter rostrum, and the more reduced  $p^2$ . The range of the genus *Rousettus* over the whole of the Ethiopian and Oriental regions, the close affinity of *R. arabicus* to the S. African *R. Leachi*, the absence of any representative of the genus from the whole of the Mediterranean subregion except Egypt, are evidence that its origin dates back to a time when, owing to different physiographic conditions, Africa and S. Asia were much more intimately connected than now. *Pterocyon* is a more specialized Ethiopian offshoot of the common prototype.

In its essential cranial and dental characters *Myonycteris* is intermediate between *Rousettus* and *Cynopterus*, though nearer to *Cynopterus*. In *Rousettus* the basicranial axis is very distinctly deflected; in *Myonycteris*, as in *Cynopterus*, it is nearly parallel to the alveolar border. In *Rousettus* the cranial rostrum has remained comparatively long, the anterior edge of the orbital cavity being vertically above the posterior half or middle of  $m^1$ ; in *Myonycteris* the rostrum is considerably shortened, chiefly owing to the fact that the anterior edge of the orbital cavity is pressed forward to a point vertically above the back of  $p^4$ ; in *Cynopterus* the rostrum is still shorter and stouter, the anteorbital rim pressed still a little farther forward, to a point above the middle of  $p^4$ . From a glance at the dental formula it would seem that *Myonycteris* (molars  $\frac{2}{3}$ ) is closely in accordance with *Rousettus* ( $\frac{2}{3}$ ), and essentially different from *Cynopterus* ( $\frac{1}{3}$ ), but in reality *Myonycteris* is also in its teeth nearer to *Cynopterus*; in *Rousettus*  $m^2$  is reduced in size, in *Myonycteris* quite rudimentary, in *Cynopterus* lost; in *Rousettus*  $m_2$  is normal,  $m_3$  small; in *Myonycteris*  $m_2$  is much reduced in size,  $m_3$  rudimentary; in *Cynopterus*  $m_2$  much reduced in size,  $m_3$  lost. In short, the cranial and dental peculiarities (non-deflection of brain-case, shortening of rostrum, reduction of posterior molars) which distinguish *Myonycteris* from *Rousettus* have been preserved, or carried still farther, in *Cynopterus*; if the skull of *Myonycteris* were known from a fossil state only, this bat would undoubtedly have been declared a "connecting-link" between *Rousettus* and *Cynopterus*. Also externally, in the form of the tip of the muzzle (vertical furrow between nostrils deep and narrow, inner margins of nostrils abruptly projecting), *Myonycteris* closely approximates *Cynopterus*.

*The Species.*—The three species of *Pterocyon* are closely interrelated. *Pt. Dupreanus*, from Madagascar, with its relatively longer rostrum and less modified fur-structure, is

apparently the least modified species. *Pt. sabæus*, from S.W. Arabia, is a small-skulled and broad-toothed representative of the African *Pt. helvus*.

The eleven known species of *Roussettus* are referable to five types:—(1) *R. Leachi*, *ægyptiacus*, and *arabicus*: rather heavily built species, with strong rostrum and teeth, the second phalanx of third digit lengthened, the pollex comparatively long; distributed over Africa generally, Cyprus, Palestine, Syria, and Arabia, as far east as Sind (Karachi); *R. ægyptiacus* is a larger-skulled modification of the *R. Leachi* type; *R. arabicus* is more closely related to the S. African *R. Leachi* than to *R. ægyptiacus*.—(2) *R. Leschenaulti*, *seminudus*, *amplexicaudatus*, *minor*, and *brachyotis*: very closely related to the species of the former group, but rather more delicately built, with slenderer rostrum, feebler teeth, the second phalanx of the third digit not lengthened, the pollex comparatively shorter; the members of this group are, probably, on the whole slightly less specialized than those of the former; *R. Leschenaulti* (continental S. Asia) and *seminudus* (Ceylon) come near to the S. African *R. Leachi* in the width of the interspace between *c* and  $p^3$ , the size and shape of  $m_3$ , the width of the ears, and the length of the tail; in the Indo-Malayan *R. amplexicaudatus* there is a tendency to a reduction of the diastema  $c-p^3$ ,  $m_2$  is smaller and more circular in outline, the ears narrower, the tail averaging longer, the general dimensions smaller; most of these characters find a climax in the Austro-Malayan *R. brachyotis*: diastema  $c-p^3$  still more reduced,  $p^2$  deciduous, ears still smaller, size smaller.—(3) *R. celebensis*: peculiarly narrow palate, narrow molars, longer and richer fur, small size, proportionally long wings; probably a modification of the *R. amplexicaudatus-brachyotis* type.—(4) *R. angolensis* (Togo, Cameroons, and Angola, to Ruwenzori), a peculiar species: skull and teeth differing in some details, fur long and dense, coloration richer than usual.—(5) *R. lanosus* (Shoa, Ruwenzori), the most aberrant species of the genus: molars excessively narrow, fur very long and dense.

From a more general point of view the first three of these groups (the members of which are certainly more closely related to each other than to those of groups 4 and 5) may be united into one section, giving a long chain of intimately connected forms from W. Africa to the Solomon Islands; *R. angolensis* and still more *R. lanosus* are aberrant representatives of this widely distributed type of bat.